METHODS FOR MAKING METALLOCENE COMPOUNDS

ABSTRACT OF THE DISCLOSURE

A method for producing Group 8 (VIII) metallocene or metallocene-like compounds employs a compound that includes a Cp' anion, such as found, together with a counterion, in a cyclopentadienide or cyclopentadienide-like salt. In one embodiment, the method includes reacting a metal salt, a (Cp) compound, such as a substituted or unsubstituted cyclopentadiene or indene, and a ligand (L) to form an intermediate compound and reacting the intermediate compound with a Cp' compound, eg., a cyclopentadienide or cyclopentadienide-like salt, where the metal salt can be is a ruthenium, an osmium or an iron halide or nitrate and L is an electron pair donor. Unsubstituted, mono-substituted as well as symmetrically or asymmetrically di- or multi-substituted metallocenes or metallocene-like compounds can be produced. In another embodiment, unsubstituted or symmetrically substituted metallocenes are formed by reacting $MX_2(PPh_3)_m$ with a Cp' compound, where m = 3 or 4. The method can be used to form precursors for chemical vapor deposition of thin films.